

PATENT APPLICATION
S/N 08/327,887

Philip Yip during the telephone interview of December 22, 1994. The art of record was discussed, as well as possible amendments to the claims, during the interview.

Applicant respectfully requests that the preliminary amendment described herein be entered into the record prior to examination and consideration of the above-identified application.

The above amendments to the specification are made to correct typographical and grammatical errors in the specification, as well as to clarify indefinite portions of the disclosure. In addition, amendments are made to Claims 1 and 3 to correct minor informalities and to otherwise ensure that the subject matter of the present invention is distinctly claimed. Claim 7 is added to provide an additional scope of patent protection to which Applicant is entitled. Support for the feature of the second insulating layer having a nonuniform thickness, a portion thereof being etched to result in the plurality of second contact holes of substantially equal depth, may be found particularly in the drawing disclosure at Figs. 2C and 2D (note second contact hole 40 over the junction layer as compared to the hole 40 over the gate electrode).

It is respectfully submitted that the amendments to the specification and claims do not add new matter.

In the final Office action dated April 22, 1994, of the prior application of this file wrapper continuation, the Examiner rejected Claims 1-6 as being unpatentable over the admitted prior art in view of Shishino (JA 0034929) and Tanaka (JA 0165320). The rejection was traversed by Applicants in a response filed on August 22, 1994. The Examiner maintained his rejection of the claims in the Advisory Action mailed on October 11, 1994.

Applicants respectfully traverse the Examiner's rejection to the extent that it is maintained in the present continuation application and to the extent that it applies to the newly-amended claims.

As Applicants have previously argued, the admitted prior art of Figures 1A, 1B and the references relied upon by the Examiner to-date cannot be properly combined to render obvious the presently claimed invention.

The prior art of Figures 1A and 1B does not suggest filling the contact holes with a two-step deposition method, nor is there any suggestion in the cited references or Figures 1A and 1B that the claimed two-step deposition process can be practically done or is even desirable. Neither

Shishino or Tanaka is related to making a device wherein contact holes have different depths. Since neither Shishino nor Tanaka is related to filling contact holes of different depths, there is no suggestion that they can be modified for overcoming the problem of preventing sideways surface growth of the upper end of a metal layer at shallow contact holes when contact holes with different depths are being filled with a metal layer. There is no indication that Tanaka or Shishino recognizes the problems associated with depositing a metal layer to fill adjacent contact holes that have different depths, much less suggests a solution to those problems.

Further, there is no teaching or suggestion in any of the art that contact holes with different depths can be filled with a two-step process at all. Although Tanaka discloses filling contact holes with a two-staged method, the contact holes are all of the same depth. Filling a plurality of contact holes of the same depth is entirely different from filling contact holes of different depths. There is no suggestion that the Tanaka method can or should be adapted for contact holes of different depths.

Combining Shishino and Tanaka with the prior art of Figures 1A and 1B will only result in a process that is substantially different from the presently claimed invention. Shishino teaches forming a smooth copper layer on top of a vapor deposited tungsten layer; thus, Shishino actually *teaches away* from forming the top portion of a contact hole with a vapor deposition process. Because neither Shishino or Tanaka forms a top portion of a contact hole with a vapor deposition method, combining these references to modify the prior art of Figures 1A-1B will only result in a process in which each contact hole has a top portion formed by a copper electrolysis plating process, which is not the claimed method.

The art of record, whether taken singly or in combination, fails to suggest (1) a method for filling adjacent contact holes of different depths, (2) that a vapor deposition method can be done in a two-step process, (3) that it is desirable to form the top portion of a contact hole with a vapor deposition method, and (4) that certain contact holes can be filled subsequent to the deposition of a metal layer in other contact holes. Therefore, the references cannot be properly combined to render obvious the presently claimed invention.

To arrive at the presently claimed invention, one would have to forsake the convenience of forming contact holes by removing insulation layer portions in a single step as described in

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the prior art of Figures 1A-1B, go against the teaching of Shishino that vapor deposition is not desirable for forming the top portion of contact holes, change the method of Tanaka into a vapor deposition method and add to that method a step of vapor depositing in a second contact hole (the second contact hole being unassociated with any first contact holes) subsequent to vapor depositing a metal layer in a first contact hole, all in the face of having no teaching or suggestion by any of the references that a two-step method is desirable for filling contact holes with different depths. Without hindsight aided by the Applicants' disclosure, a skilled art worker would not have found it obvious to arrive at the presently-claimed method.

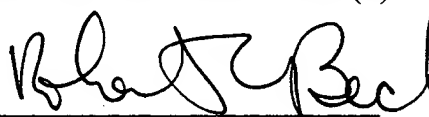
In view of the above amendments and remarks, it is believed that Claims 1-7 are neither anticipated by nor obvious in view of the art of record. Therefore, an indication of the allowability of these claims is earnestly solicited.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact the below-signed attorney at (612) 336-4638.

Respectfully submitted,

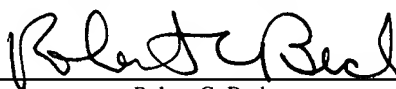
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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231 on:

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